

SUPPLEMENTARY INFORMATION

1. Absorption difference spectra due to electron doping at high electric displacement field (extension to Fig. 3 in the main text)

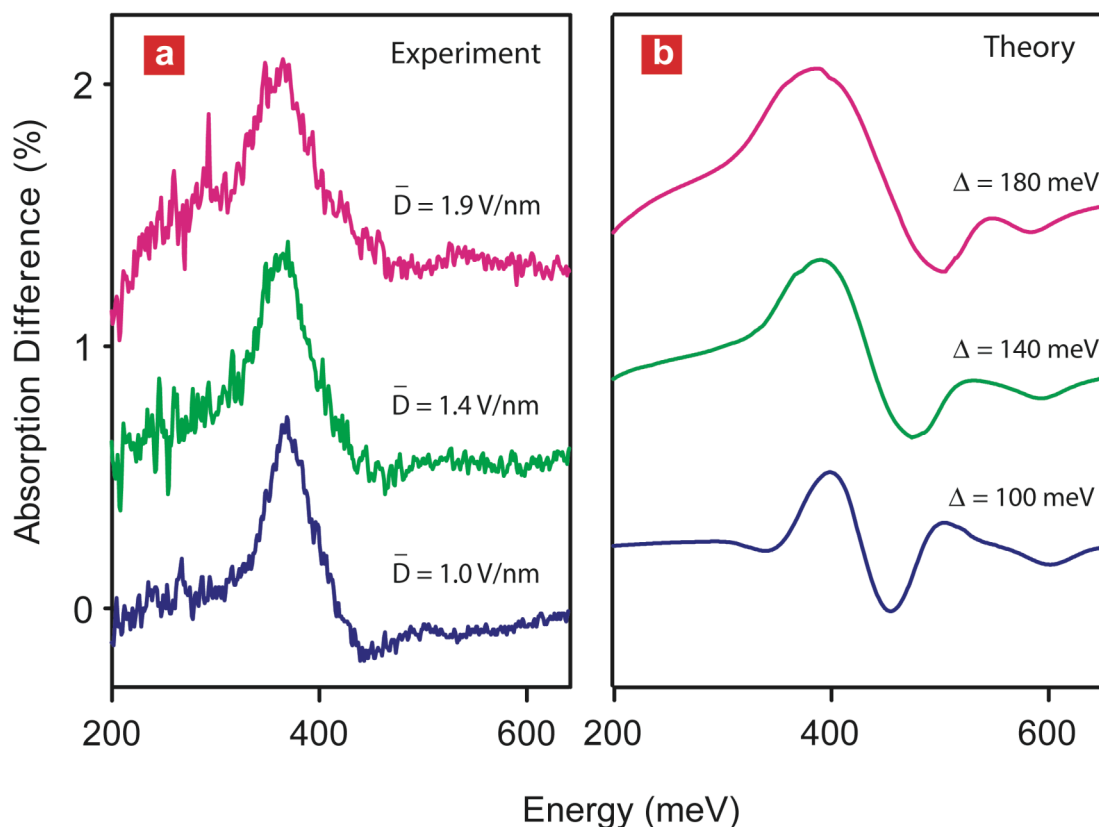


Fig. 1S: **Doping effect at high electric displacement field.** **a.** Absorption difference between electron doped ($\delta D = 0.15$ V/nm) and charge neutral bilayer ($\delta D = 0$) at high displacement fields \bar{D} . **b.** Calculated absorption difference spectra based on a tight binding model using the gate-induced bandgap (Δ) as an adjustable parameter. Both experiment and theory show a broadening of the absorption peak and the appearance of reduced low energy absorption at the highest displacement field. Such low energy absorption reduction is due to the Pauli blocking of bandgap transitions.